

# 624H Repower Work Instructions

6068HF285-624H



Revision: C

27 July, 2010



**JOHN DEERE**

**Attention - Service Manager - Attention**

Experience has shown that putting Tier 2 and Tier 3 power plants into engine compartments designed for much older Tier 0 and Tier 1 models almost always involves trade-offs and compromises. You need to be aware that the equipment options on your candidate machine may differ from the options installed on the prototype unit used for kit development. Particular examples might include cabs on bulldozers and the presence of air conditioning. In addition, individual interpretations abound with respect to the “best way” to execute a repower. For these reasons, Western Power Products will not be responsible for any additional cost an installing dealer incurs to 1) adapt a kit to a machine configuration different from the machine used to develop the kit or 2) to provide additional kit elements or alternate component mounts or orientations employed to satisfy individual dealer preferences for their final repower product. So before quoting, always start with a thorough review the installation instructions and engine codes to identify potential areas you suspect might require additional material and labor. If you are uncertain, talk to a Western Power Products’ engineer at 888-ENG-POWR or 661-397-9155. They will help you develop a more complete picture of the scope of your repower project.

## Table of Contents

624H Repower Work Instructions .....	1
6068HF285-624H .....	1
1 Parts.....	4
2 Removing Old Engine.....	5
3 Service Radiator.....	5
4 Installing New Engine.....	5
5 Wiring and Wire Harness.....	6
6 Modifying Controls.....	10
6.2 Key Switch.....	14
7 Hood Modifications .....	15
7.1 Air Cleaner Mounting .....	16
7.2 Exhaust Mounting .....	17
Appendix A: 6068HF285 Engine Specification .....	21
Appendix B: Electronics .....	23

## Figures and Tables

Figure 1: Radiator Removal.....	5
Figure 2: New Engine Installation .....	5
Figure 3: CAC Tube Routing.....	6
Figure 4: Wiring Harness Routing .....	6
Figure 5: Rear Left Wiring Harness Routing.....	7
Figure 6: Extension Harness to ECU .....	7
Figure 7: ECU Mounting Location .....	8
Figure 8: Pre-threaded Mounting Holes.....	8
Figure 9: Harness Routing Through ECU Compartment.....	9
Figure 10: Underside of ECU Compartment .....	9
Figure 11: Modified Instrument Panel with PowerView .....	10
Figure 12: RE534022B Instrument Panel Harness .....	11
Figure 13: Wiring Harness Routing Through Cab.....	11
Figure 14: AG-11 Analog Foot Throttle Wiring.....	12
Figure 15: Potentiometer Mounting On Accelerator Pedal.....	13
Figure 16: Underside of Accelerator with Potentiometer .....	13
Figure 17: Key Switch .....	14
Figure 18: New Exhaust Stack and Air Cleaner Locations.....	15
Figure 19: Air Cleaner Mounting.....	16
Figure 20: Air Inlet Hose Routing .....	16
Figure 21: Muffler Mounting Location.....	17
Figure 22: Muffler Support Bracket.....	17
Figure 23: Mocked Up Muffler Support Bracket.....	18
Figure 24: Muffler Support Bracket Base.....	19
Figure 25: CCV Tube Routing.....	19
Figure 26: Muffler Support Bracket Modification for CCV .....	20
Figure 27: Muffler Support.....	20
Figure 27: 21-pin Deutsch Instrument Panel Connector.....	23
Figure 29: 21-pin Deutsch Instrument Panel and Controls .....	23
Figure 30: Wiring Harness.....	24

# 1 Parts

Table 1: Parts List

CATEGORY	PART	QTY	DESCRIPTION
<b>KIT 6068HF285-624H</b>			
<b>CAC</b>	50-250-300-110	2	2.5" COUPLER
	51-250-300-300-110	2	2.5" TO 2" REDUCER
	WCT624A01	1	HOT CAC TUBE
	WCT624A02	1	COLD CAC TUBE
	AH170895	6	2.5" CLAMP
	AT105289	2	2" CLAMP
<b>EXHAUST</b>	M101171	1	MUFFLER
	9V15881	1	EXHAUST CLAMP
<b>RADIATOR</b>	T181335	1	RADIATOR HOSE
	T181336	1	RADIATOR HOSE
	TY22472	4	RADIATOR HOSE CLAMP
<b>ELECTRONICS</b>	RE534022B	1	INSTRUMENT PANEL
	AT332120	1	THROTTLE POTENTIOMETER
	AT332121	1	THROTTLE PEDAL HARNESS
	AT332122	1	THROTTLE PEDAL PLATE
<b>AIR CLEANER</b>	AT225535B	1	AIR CLEANER KIT
	H88782	2	AIR CLEANER ELBOW HOSE
	WRPAFT4ODA01	1	4" OD X 16" AIR FLOW TUBE
	RE67747	4	HOSE CLAMP
	28H1981	4	SPACER
	AT175358	1	INTAKE RAINCAP
	AR64937	2	SUPPORT BAND
	1675-202	1	1/8" FITTING
	135501-10825	1	FILTER
<b>MISC</b>	WRP624HA01	1	HOOD MODIFICATION TEMPLATE
	WRP624HA02	1	ACCELERATOR PEDAL MOUNTING PLATE
	R522690	1	AUX DRIVE GASKET
	R120467		45 DEGREE CCV ELBOW FITTING
	T178416		V-BELT

\*Due to differences in configurations, you may need to supply miscellaneous mounting hardware.

## 2 Removing Old Engine

- Remove old engine according to the 624H Service Manual
- Remove air cleaner mounting bracket from old engine – this will be used as the exhaust mounting bracket on the new engine

## 3 Service Radiator

- Check radiator and service if necessary



Figure 1: Radiator Removal

## 4 Installing New Engine

- Install new engine per service repair manual
- Reinstall hydraulic pump



Figure 2: New Engine Installation

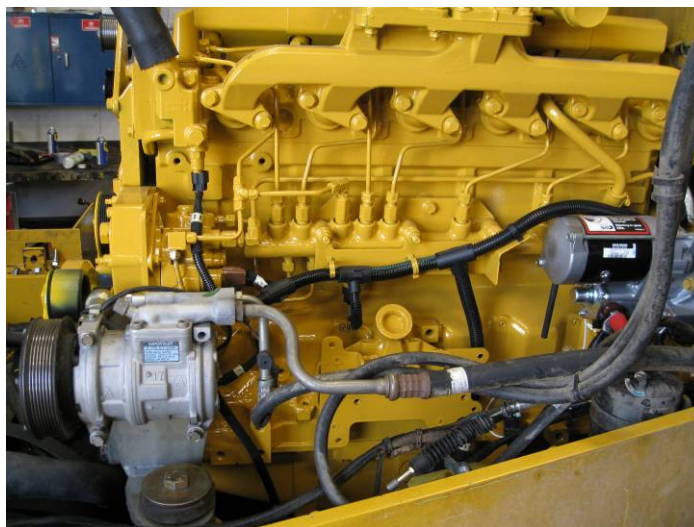


**Figure 3: CAC Tube Routing**

- Re-install radiator if it needed to be removed for service
- Connect radiator hoses, new CAC pipes, fuel lines

## **5 Wiring and Wire Harness**

- Install wiring harness per service repair manual
- Be sure to keep harness away from high temperature locations such as the exhaust manifold
- Connect sensors to engine
- Secure harness to engine with zip ties



**Figure 4: Wiring Harness Routing**





**Figure 5: Rear Left Wiring Harness Routing**

- Run excess wiring underneath the right side of the cab



**Figure 6: Extension Harness to ECU**

- On the right side of the cab use a 13mm wrench and undo the 2 screws holding the access panel closed.



**Figure 7: ECU Mounting Location**



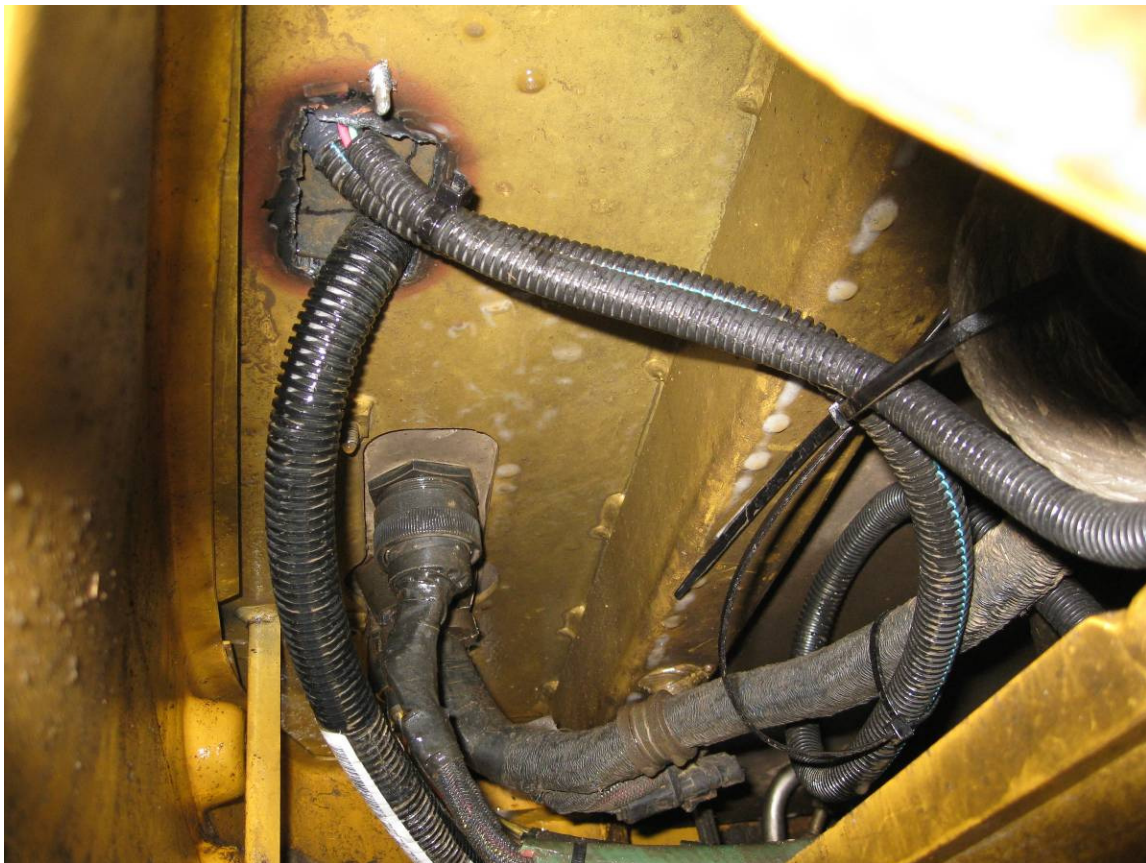
**Figure 8: Pre-threaded Mounting Holes**

- In the access panel, you will find 2 power control modules and wiring
- Mount the engine control module to the pre-threaded holes on the wall that separates the other power control module that it already installed; see Figure 8: Pre-threaded Mounting Holes





**Figure 9: Harness Routing Through ECU Compartment**



**Figure 10: Underside of ECU Compartment**

- With cutting torch, cut a hole below the ECU to route the wiring harness underneath the cab to engine and connect to ECU

## 6 Modifying Controls

### 6.1.1 Power View Installation



**Figure 11: Modified Instrument Panel with PowerView**

- Remove the harness, switches, key switch, and Power View from the instrument panel.  
Figure 12: RE534022B Instrument Panel Harness
- Using 1 ½ inch hole saw cut a hole next to the floorboard and the hydraulic control panel
- Remove ashtray; PowerView will be installed in the old ash tray location
- On the left hand side of the dash with 1 ½" hole saw cut a hole even with the ashtray
- Route PowerView wiring connector to the hole on the left hand side of the dash
- Connect the PowerView to CAN Bus and power
- Install PowerView in ash tray location
- Carefully route harness extension from the left side of the dash below and around the right side of the cab. Ensure that the cable does not interfere or damage foot pedal controls
- Once past all foot pedals, lift up the floor mat and run harness around the contour of the cab
- Reinstall floor mat





**Figure 12: RE534022B Instrument Panel Harness**



**Figure 13: Wiring Harness Routing Through Cab**

- Connect harness to the 21 pin connector through the 1 ½" hole previously drilled through the cab and the hydraulic control box

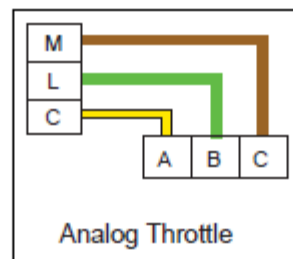
### 6.1.2 Throttle Modification

The mechanical throttle linkage must be changed to accommodate the new electronic engine. Replace the mechanical system with the throttle potentiometer.

- Remove old pedal and cable
- Install new pedal with provided WRP624HA02 bracket
- Route throttle sensor wires through floor of cab and to 21 pin instrumentation and controls connector on the wiring harness.
- See AG11-P-11 for additional details on the foot throttle:

#### Electrical Hook-up

To attach the primary analog throttle to the JDEC controller, a Packard 3-way Male Connector (P/N 12015793), using 12033674 terminals, needs to be attached to the John Deere wiring harness pins as shown.



M is the 5V reference voltage pin  
L is the throttle signal pin  
C is the ground.

The corresponding connection in the throttle connector is as follows:

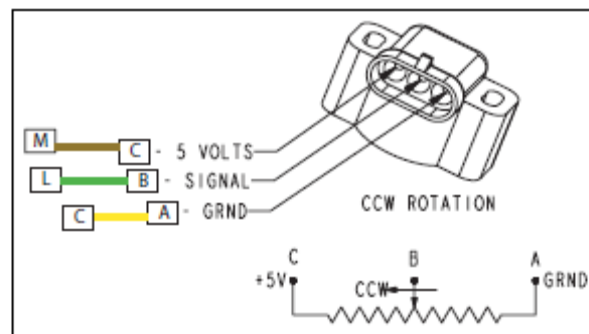
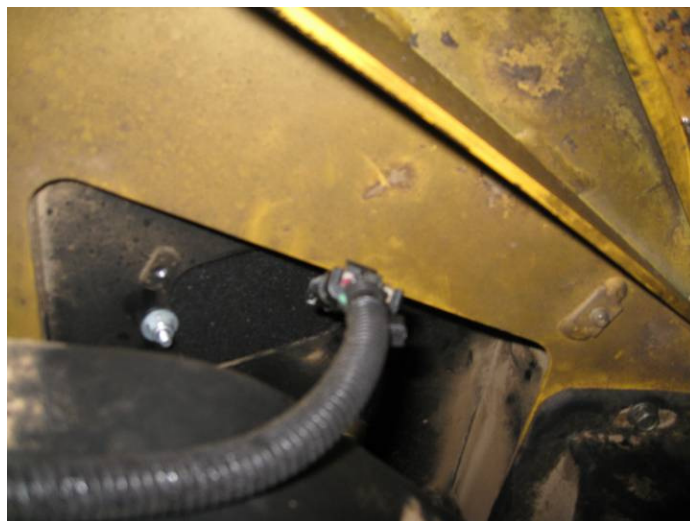


Figure 14: AG-11 Analog Foot Throttle Wiring



**Figure 15: Potentiometer Mounting On Accelerator Pedal**



**Figure 16: Underside of Accelerator with Potentiometer**



## 6.2 Key Switch

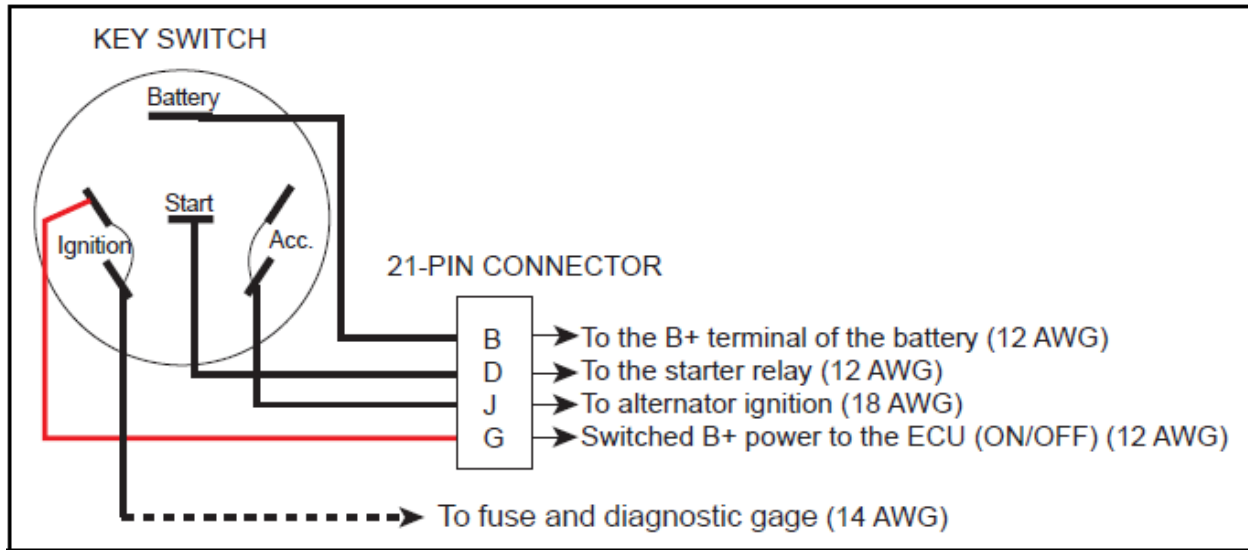


Figure 17: Key Switch

### Key Switch

Install the wiring harness into the original key switch or transfer the key switch from the RE534022B instrument panel.

## 7 Hood Modifications

The new engine configuration requires modifications to the hood to accept the new air cleaner and exhaust. The Tier III 6068HF285 2 valve engine only comes in front exhaust configuration, so the change from a rear exhaust engine to front exhaust necessitates the relocation of the air cleaner.

See WRP624HA01 - HOOD MODIFICATION TEMPLATE for a 1:1 scale template of where to cut the new holes for the exhaust stack. The old exhaust stack hole is used for the air cleaner.

The following figures point out the purpose of each modification to the hood:

- Mount Air Cleaner in old Exhaust Stack Location
- Mount the Exhaust Stack as shown in Figure 18: New Exhaust Stack and Air Cleaner Locations



**Figure 18: New Exhaust Stack and Air Cleaner Locations**

- Cut holes in hood according to *WRP624HA01*

- The drawing is a top view
- Align the drawing with the back edge of the hood and existing slot
- The portion to cut will create a second exhaust stack mount which looks like the standard exhaust stack mount.

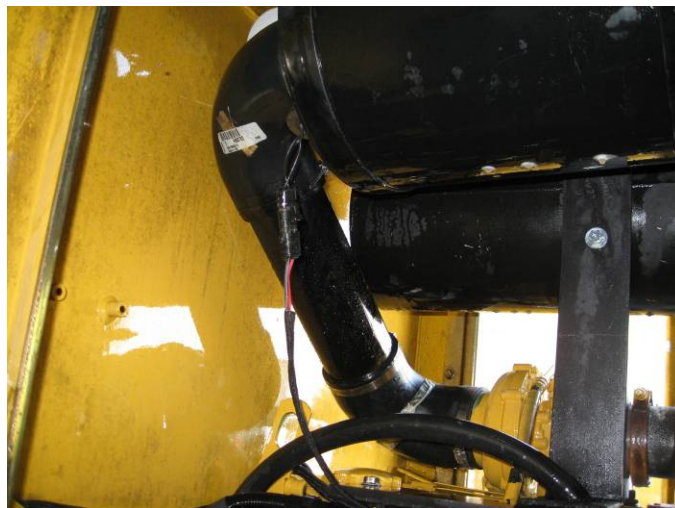
## **7.1 Air Cleaner Mounting**

- Install air cleaner in location of the previous muffler



**Figure 19: Air Cleaner Mounting**

- Use washers to space the saddle brackets from the top of the hood



**Figure 20: Air Inlet Hose Routing**

- Secure air inlet hose to turbo

## **7.2 Exhaust Mounting**



**Figure 21: Muffler Mounting Location**



**Figure 22: Muffler Support Bracket**

- The muffler support bracket will mount in the same location on the new engine

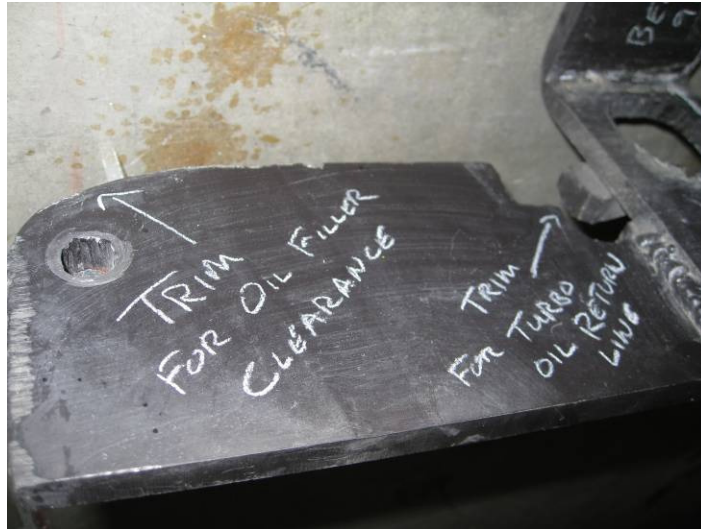




**Figure 23: Mocked Up Muffler Support Bracket**

- Obtain a 22" X 3" piece of 1/4" plate
- Scribe a bend line 5" from one end, heat with a torch, and bend up 90 degrees
- Filet weld the support to the muffler support bracket. You will need 2" gap from the right side of the bracket. See Figure 23: Mocked Up Muffler Support Bracket for completed bracket.
- Using muffler mounting bracket from previous engine mock bracket to new engine and with a pencil scribe the corner closest to the cab in a circular pattern to be ground off/removed to clear valve cover oil cap.





**Figure 24: Muffler Support Bracket Base**



**Figure 25: CCV Tube Routing**

- Remount bracket
- With a pencil scribe the center of the bracket where the crank case ventilation hole and valve cover come in contact
- Install the R120467 – 45 DEGREE CCV ELBOW FITTING on the engine – the 90 degree fitting will not clear the exhaust support bracket.



**Figure 26: Muffler Support Bracket Modification for CCV**

- Remove bracket and cut a circular hole in bracket as marked to obtain crank case ventilation elbow
- Remount bracket
- Attach one AR64937 air cleaner saddle bracket to muffler. Mock up the vertical section of plate to the saddle bracket and scribe mounting holes
- Bolt air cleaner saddle bracket on the muffler to the exhaust support bracket.



**Figure 27: Muffler Support**

# Appendix A: 6068HF285 Engine Specification

Table 2: Engine Option Codes

<b>Product: PE 6068HF285 Diesel Engine (2684F) Specification Name: 6068HF285-624H</b> <b>Final Specification Number: S022139</b> <b>Create Date: 09Dec2009 Build Number: 2 Customer Name:</b>	
Code	Description
As Of Date	09Dec2009
Base	PE 6068HF285 Diesel Engine (2684F)
1142	Rocker Arm Cover, Rear Fill, w/ John Deere Nameplate
1201	Oil Filler, RH, for use w/ Remote Mounted ECU
1324	Crankshaft Pulley, 168mm (6.6"), Standard Duty Damper, for Taper Nose Crank
1406	Flywheel Housing, SAE #3, LH, 3 Bolt Type 1 Starter Mount, Front Access for Torque Converter, Magnetic PU
1503	Flywheel for SAE #3, 11.5" OCC, 129 Tooth 8/10 Pitch Ring Gear
16A6	Fuel System, Denso HPCR w/ECU, 1000cc Flow Injector, Industrial - 116kW (155hp) thru149kW (200hp) and Gen-Set - 147kW (197hp) & 177kW (237hp) at 1800RPM
1783	Air Intake, Vertical Intake
1909	Oil Pan, Aluminum, Deep Center Sump, 45° Int & 20° Cont. Off-Level, 19L
2156	Thermostat Cover, Vertical Outlet, Single Thermostat, Two Sensor Ports
2201	Thermostat, Single
2395	No Fan Housing, w/ Fan Mount Capability
2499	No Fan Belt
2699	No Engine Cylinder Block Heater
28AV	Exhaust Manifold, High Mount Turbocharger
2957	Vent System, 90° Elbow w/o Clamp, 1100mm (43") Vent Hose, Clamped to Right Side of Flywheel Housing
3041	24V Denso, 10 HP (7.5 kW), LH, 3-Bolt, Type 1 Mount, Gear Reduction
3142	24V, 45 Amp Bosch, w/ Wiring Harness
35ED	6.0", 2 Micron Final Fuel Filter, RH Side, Engine Mounted (contains port for optional low pressure fuel sensor)
3614	Front Plate, w/Aux-Drive, HPCR
3999	No Thermostat Housing (Cover Only)
4002	Dipstick, RH Side Service
4199	No Auxiliary Front Drive Pulley
4399	No Starting Aid
4434	Timing Gear Cover, Aux-Drive, w/ Fan Mount Support (High Mount Alternator)
5204	Base Engine Auxiliary Drive w/ Shipping Cover (less drive gear)
5399	No Fuel Heater
5569	Shipping Stand, Metal
5603	Industrial Yellow
5722	Water Pump Inlet, Downward Orientation w/ M18 Port
5902	Oil Cooler, 7 Plate
6099	No Auxiliary Fan Drive Pulley
6277	Alternator Mounting, High Position, Bosch 45-120 Amp, for Aux Drive
6387	Engine Mounted Primary Filter, High RH Rear Engine Mounted Final Filter - Air Compressor Compatible
6438	Exhaust Elbow
65RM	Turbocharger, High Mount, Industrial (High Power) & Gen-Set, RH Low Rear Oil Filter
6730	Base Engine Sensors
6901	Serial Number Plate
72MC	24V, 185HP, 138kW@2200, 4% PB, 31% TR
7499	No Air Conditioning Compressor Bracket
7899	No Air Compressor
8171	RH Side, Engine Mounted, High RH Side, 6.0", 30 Micron Primary Fuel Filter w/ Water Separator and W.I.F Sensor
83DR	ECU Software, John Deere Custom Performance - Industrial 138kW (185HP) thru 149kW (200HP) (500 Hour Oil Change Interval)
8453	Remote Mounted ECU, 24V, w/wiring harness and hardware installed, ECU shipped loose, Distributor/OEM Installed, w/10

	foot of harness, 402 mm fan height
8699	No Fan Pulley
8718	Belt Tensioner, Auto, High Mount & Low Mount Alternator, for use w/Aux-Drive
8843	Oil Filter, RH Low Rear
9109	Extension Harness - 21 Pin, Customer/Panel Interface Harness to Instrument Panel, 12 Foot (3.7M), Qty - 1 (packaged & shipped w/engine)
9113	Customer/Panel Interface Harness, Remote Mounted ECU to Instrument Panel, packaged & shipped w/engine (contains the 21 & 23 pin connectors, 9 pin diagnostic connector, starter relay leads, power/ground leads, TVP, Aux Power, CAN Terminator, Remote On
93GP	Emission Label, Tier 3 Industrial Applications (185hp / 138kW thru 200hp / 149kW)
9499	No Software Trim

## Appendix B: Electronics

Pin	Circuit No.	Color	Wire Gauge	Description	Function
	Ext.				
A	474	yellow	18	Intake heater wait lamp	To ground side of intake air heater wait lamp
B	032+	red	12	Fused unswitched battery power	To "B" terminal of your ignition switch
C	914*	yellow	18	Sensor return	To the primary analog throttle potentiometer or emulator
D	422	red	12	Starter relay	To "Start" terminal on your ignition switch
E	050	black	18	Ground	Grounded on the engine side to the battery and ECU. Use for any non-sensor ground (lights, gauge power, etc)
F	020	black	18	CAN shield	To any CAN connectors including the PowerView Diagnostic gauge
G	012	red	12	Battery power to ECU (switched)	Must be wired to the "Ignition" terminal of key switch.
H	473	orange	18	Warning lamp driver	To ground side of the warning lamp
J	412	red	18	Alternator ignition	Should be wired to the "Acc'y." or "Ignition" terminal of the ignition switch.
K	439	white	16	Tachometer output	A synthesized frequency signal that can be used to drive a non-CAN electronic tachometer
L	915*	green	18	Primary analog throttle input voltage	To center (sensing) terminal of the primary analog throttle potentiometer (or throttle emulator)
M	911*	brown	18	+5 Volts (sensor power)	To the throttle potentiometer
N	918	gray	18	Shutdown override	To shutdown override switch
P	911	brown	18	Shutdown override return	To shutdown override switch
R	947	violet	18	Throttle switch	Throttle switch (2-state or Ramp)
S	914	yellow	18	Sensor return	Sensor return
T	936*	blue	18	Resume / Coast / Bump Speed Down	To the 2-state throttle speed select switch and/or the cruise resume/coast switch
U	905	green	18	CAN low	To any SAE J1939 CAN-based devices including the Diagnostic gauge
V	904	yellow	18	CAN high	To any SAE J1939 CAN-based devices including the diagnostic gauge
W	955*	green	18	Set/Accelerate/Bump Speed Up	For adjustable 3-state throttle option.
X	923*	orange	18	Bump enable and brake enable	For adjustable 3-state throttle option.

+ DE10 Standard ECU Circuit Number is 022.

\* Not available on DE10 Standard ECU.

Figure 28: 21-pin Deutsch Instrument Panel Connector

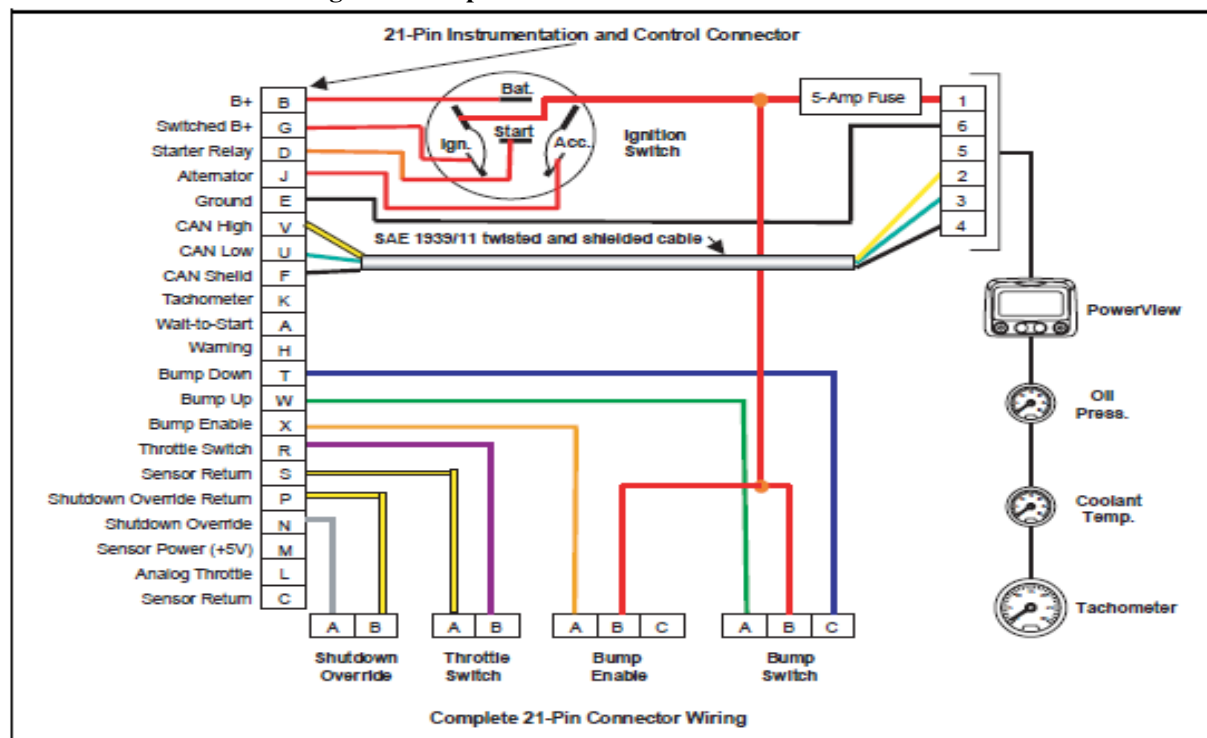


Figure 29: 21-pin Deutsch Instrument Panel and Controls



## L16 Application Interface

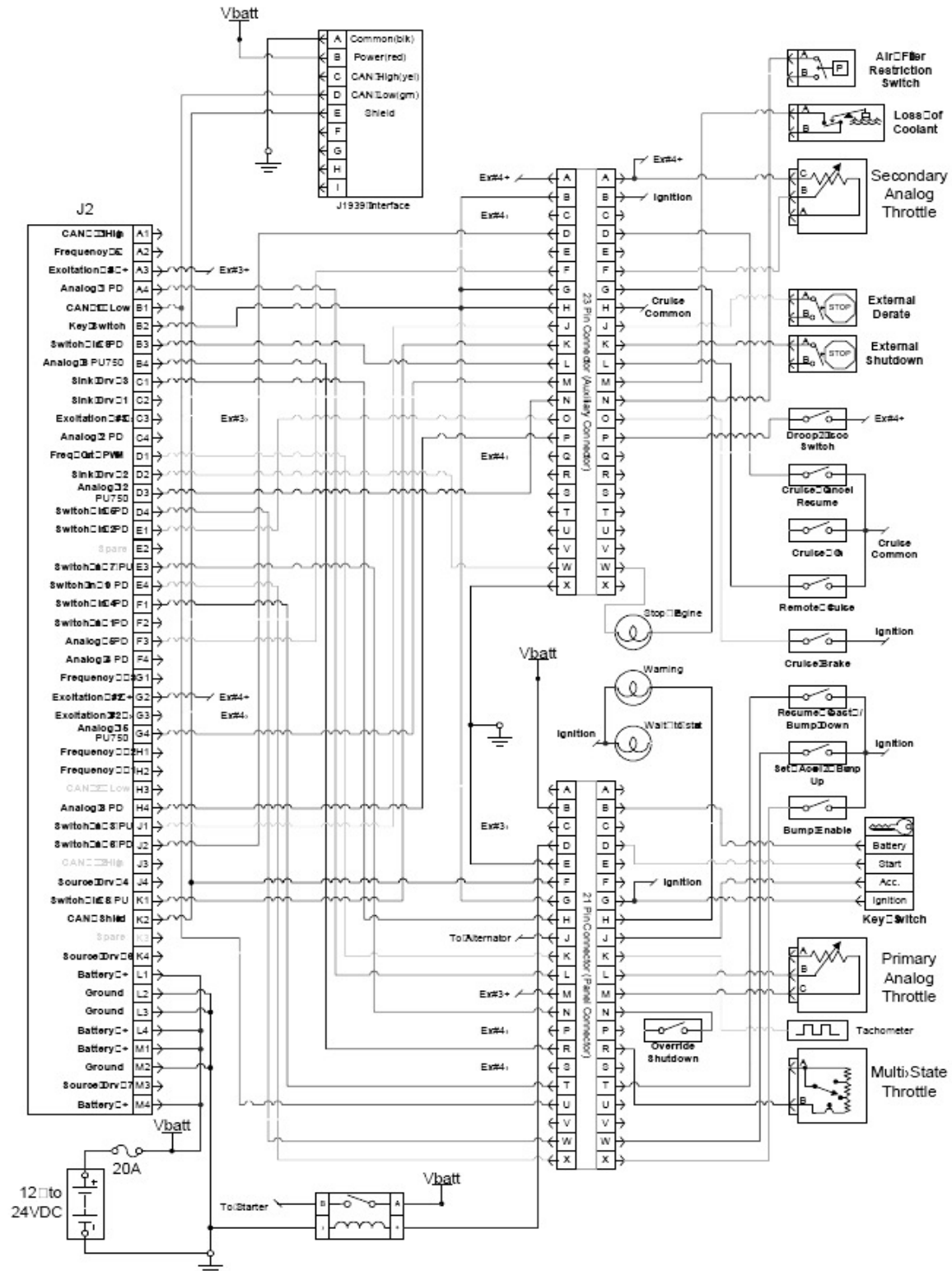


Figure 30: Wiring Harness